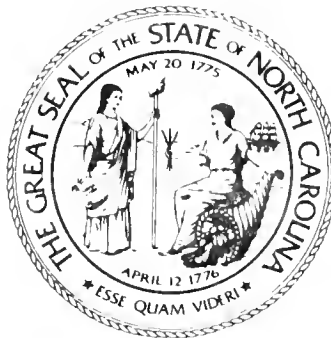


LEGISLATIVE RESEARCH COMMISSION

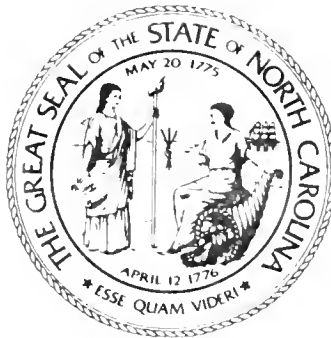
HAW RIVER AND JORDAN RESERVOIR WATER QUALITY



**REPORT TO THE
1987 GENERAL ASSEMBLY
OF NORTH CAROLINA**

LEGISLATIVE RESEARCH COMMISSION

HAW RIVER AND JORDAN RESERVOIR WATER QUALITY



**REPORT TO THE
1987 GENERAL ASSEMBLY
OF NORTH CAROLINA**

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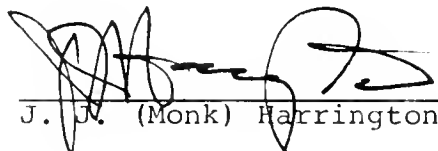
TO THE MEMBERS OF THE 1987 GENERAL ASSEMBLY:

The Legislative Research Commission herewith reports to the 1987 General Assembly on the matter of water quality in the Haw River and Jordan Reservoir. The report is made pursuant to Chapter 790 of the 1985 Session Laws.

This report was prepared by the Legislative Research Commission's Committee on Water Quality in the Haw River and Jordan Reservoir and is transmitted by the Legislative Research Commission for your consideration.

Respectfully submitted,


Liston B. Ramsey


J. J. (Monk) Harrington

Cochairmen

Legislative Research Commission

LEGISLATIVE RESEARCH COMMISSION

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PREFACE

The Legislative Research Commission, authorized by Article 6B of Chapter 120 of the General Statutes, is a general purpose study group. The Commission is cochaired by the Speaker of the House and the President Pro Tempore of the Senate and has five additional members appointed from each house of the General Assembly. Among the Commission's duties is that of making or causing to be made, upon the direction of the General Assembly, "such studies of investigation into governmental agencies and institutions and matters of public policy as will aid the General Assembly in performing its duties in the most efficient and effective manner" [G.S. 120-30.17(1)].

At the direction of the 1985 General Assembly, the Legislative Research Commission has undertaken studies of numerous subjects. These studies were grouped into broad categories and each member of the Commission was given responsibility for one category of study. The cochairmen of the Legislative Research Commission, under the authority of General Statute 120-30.10(b) and (c), appointed committees consisting of members of the General Assembly and the public to conduct the studies. Cochairmen, one from each house of the General Assembly, were designated for each committee.

The study of Water Quality in the Haw River and Jordan Reservoir was authorized by Section (19) of Chapter 790 of the 1985 Session Laws (1985 Session). That act states that the Commission may consider House Joint Resolution 1393 in determining

the nature, scope and aspects of the study. Section 1 of House Joint Resolution 1393 reads: "The Legislative Research Commission is authorized to continue the study of water quality in the Haw River and B. Everett Jordan Reservoir begun under Section 1(16) of Chapter 905, Session Laws of 1983." Relevant portions of Chapter 790 and House Joint Resolution 1393 are included in Appendix A.

The Legislative Research Commission grouped this study in its environment area under the direction of Representative Bruce Ethridge. The Committee was chaired by Representative Joe Hackney and Senator Russell Walker. The full membership of the Committee is listed in Appendix A of this report.

COMMITTEE PROCEEDINGS

The Legislative Research Commission's Haw River and Jordan Reservoir Water Quality Study Committee continued the study of the water quality in the Haw River-Jordan Lake watershed that began several years ago. During its study the Committee considered a number of topics but focused attention on three main areas: the current water quality of the Haw River-Jordan Lake watershed, including the success of past programs implemented to control pollution and additional efforts needed to protect and improve water quality; the allocation of water from Jordan Reservoir to local governments requesting to share the water supply; and the possible inclusion of the Haw River into the State's Natural and Scenic Rivers System.

The Committee met four times. Brief summaries of the meetings and the issues considered at each follow.

April 25, 1986

The first meeting, held prior to the short session, was a review of water quality issues and an update on the quality of water in the Haw River and Jordan Reservoir. The issue of water allocation from Jordan Reservoir to local governments was also presented for the Committee's consideration.

Presentations by Dr. Donald Francisco, Department of Environmental Sciences, University of North Carolina at Chapel Hill; Dr. Rick Maas, National Water Quality Evaluation Project; and members of the Department of Natural Resources and Community Development indicated that there is disagreement among experts as to the suitability of Jordan Reservoir as a drinking water supply.

All agreed that while current pollution control legislation and programs implemented in past years address some major water quality problems and have benefited the Haw River and Jordan Lake, continued monitoring and study is needed in the area of aquatic toxics. Bioassay monitoring, the use of test organisms to detect pollution, is one method currently used to screen for toxics. While this monitoring technique is helpful, one speaker pointed out that it is still difficult, if not impossible to measure the presence of organic compounds, toxic or not, in water. He suggested that because of the difficulty in detecting organic compounds, discharges should be monitored for toxics before they are released into a water supply.

John Morris, Director of Water Resources Division, Department of Natural Resources and Community Development, addressed the Committee on the issue of water allocation. He informed the Committee that Jordan Lake has an estimated water supply yield of 100 million gallons per day. The cost of the water supply element is approximately five million dollars and that cost must be repaid to the federal government. The State is responsible for allocating the available water supply to local governments. Those communities receiving allocations will repay a share of the cost of the project in proportion to the allocation received. Mr. Morris indicated that the Environmental Management Commission's subcommittee was in the process of developing an administrative rule that would outline the policies and procedures for allocating water.

October 24, 1986

At the second meeting the following issues were addressed: the status of the administrative rule outlining policies and

procedures for water allocation; the possibility of imposing a surcharge on allocations from Jordan Reservoir to create additional funding to supplement research programs conducted to monitor and improve the water quality of the Reservoir and to develop watershed protection plans in the Jordan basin; water quality protection enforcement problems identified by the Department of Natural Resources and Community Development; and the possibility of including segments of the Haw River in the National Wild and Scenic River System and the State Natural and Scenic Rivers System.

John Morris, Director of Water Resources, Department of Natural Resources and Community Development, informed the Committee that the Environmental Management Commission had adopted a concept of how water should be allocated but was continuing to develop specific guidelines for the allocation process. Mr. Morris also indicated that current law authorizes the division to allocate water and that no additional legislation for that purpose is necessary.

Ed Holland, representing the Triangle J Council of Governments suggested that the Committee consider the possibility of imposing a surcharge on water allocations from Jordan Reservoir. Mr. Holland proposed that the surcharge monies be used to supplement State funding of research programs and watershed protection plans for the Haw River-Jordan Reservoir basin. He offered to provide additional details at the next meeting.

The Department of Natural Resources and Community Development gave two detailed presentations on problems encountered by the department in attempting to verify that individuals receiving wastewater discharge permits comply with the terms of those permits.

The first presentation addressed the current fee scale for wastewater discharge permits. Dr. George Everett, Water Quality Section Chief of the Environmental Management Division, informed the Committee that because of inadequate funding and personnel, his staff is able to inspect major waste treatment plants only once a year and smaller plants an average of once every five years. Inspections of major plants should be conducted twice a year and smaller plants should be inspected once a year. He also indicated that a backlog of 600 permits exists and the number of new applications to be processed continues to rise.

North Carolina law provides that an application fee of no more than one hundred dollars may be charged for pollution control permits. There is no provision allowing an additional fee to be charged to cover costs of administering the permits and verifying compliance with the terms of the permits. Thus, North Carolina recovers only a small percentage of the cost of its pollution control permit programs through permit application fees. The Committee was informed that many states have a dual fee system. A fee is charged to cover the cost of processing applications and an additional fee is charged of those issued permits to cover the administrative and enforcement costs connected with the permits. States with this type of fee structure are able to recoup a significantly larger percentage of the costs involved in running pollution control permit programs. Dr. Everett asked the Committee to consider increasing the maximum application fee for wastewater permits to four hundred dollars and to authorize the Environmental Management Commission to charge an additional fee not to exceed ten thousand dollars of those issued permits. He also proposed that the additional funds

generated by the revised fee structure be used to create forty-five new positions for personnel to process applications, issue permits and conduct compliance inspections.

In a second detailed presentation, Dr. Everett informed the Committee of water pollution problems that result when package plants are improperly maintained or operated. These problems are serious and can require immediate and expensive action. Often, this type of treatment work is held in a form of joint or multiple ownership. Because the problem must be addressed quickly and because it is difficult to locate all responsible parties on short notice, the cost of repairs, clean up, or providing a properly trained individual to operate the package plant is often borne by either the State or the local government affected. The Department of Natural Resources and Community Development proposed that a bond be required of any one applying for a permit to install or operate package plants.

The final item considered at the meeting was a discussion of the National Wild and Scenic River System, the State Natural and Scenic Rivers System, and the qualifications and procedures that must be satisfied to have a river included in either system. A report updating the "Development Features Inventory of the Haw River and Neuse River since 1977" was provided to the Committee. The report was prepared by the North Carolina Division of Parks and Recreation for the National Park Service which maintains a Nationwide Rivers Inventory. The Nationwide Rivers Inventory is a list compiled by the National Park Service of rivers that may qualify for the National Wild and Scenic River System. Approximately 65 miles of the Haw River is listed in the Nationwide Rivers

Inventory. The portion of the river listed in the inventory begins at river mile 22 which is located at the Chatham County line near N. C. 1545 and flows to river mile 87 which is located near U.S. 220 and the N. C. 150 bridge. This portion of the river flows through Alamance, Orange, Guilford, and Rockingham Counties. The report submitted this summer by the State Parks and Recreation Division updating the developmental inventories of the Neuse and Haw Rivers recommended that an additional seven mile segment of the Haw River flowing from river mile 22 at the Chatham County line downstream to the dam at Bynum at river mile 15, be included in the Nationwide Rivers Inventory.

The Department of Natural Resources and Community Development also has a list of 28 rivers that may qualify for inclusion in the State Natural and Scenic Rivers System. The list was compiled from a statewide survey and includes a twenty-eight mile segment of the Haw River. That segment flows from the U.S. 64 bridge to the dam at Swepsonville and goes through the Counties of Chatham, Alamance, and Orange.

A copy of the report prepared by the State Parks and Recreation Division and a list of the Streams Segments Being Considered for the North Carolina Natural and Scenic Rivers System is in Appendix B.

November 12, 1986

At its third meeting the Committee considered drafts of legislation proposed to achieve two different objectives: (1) change the current fee scale for pollution control permits to allow a maximum application fee of \$400 and to allow an additional charge upon the issuance of those permits to cover administrative costs and the cost of conducting compliance inspections, and (2) require

that a bond be furnished by an applicant, requesting a wastewater discharge permit, who intends to install or operate certain specified types of treatment works. In lieu of a bond, a written agreement between the affected local government and the applicant may be provided in which the local government agrees to assume maintenance, operational, and financial responsibility for the treatment works if there is a violation of the permit conditions by the applicant and the local government is directed to assume responsibility by the Environmental Management Commission. The agreement must be approved by the Environmental Management Commission.

The Committee approved both drafts with minor changes.

Additional information was presented on the proposal to impose a surcharge on water allocation from Jordan Reservoir. The Committee agreed that legislation in this area would be premature.

The Committee briefly reviewed the information provided at an earlier meeting on the State Natural and Scenic Rivers System and the inventories report prepared on the Haw River by the State Parks and Recreation Division. The Committee requested the Department of Natural Resources and Community Development to study the segment of the Haw River which flows from Swepsonville to the Chatham County line for inclusion in the State Natural and Scenic Rivers System.

After a brief discussion about the proposed landfill in Alamance County and about State law regulating landfills, the Committee asked that legislation be drafted prohibiting the location of any landfill within 2500 feet of a major river or a major tributary.

November 24, 1986

The Committee reviewed the recommendations and proposed legislation included in the draft of the final report. The Committee then approved both.

FINDINGS AND RECOMMENDATIONS

Based on the information and concerns expressed by numerous individuals at meetings, the Committee makes the following findings and recommendations:

Finding 1: The current fee scale for pollution control permits authorized by the General Assembly is inadequate and should be revised to reflect more accurately the costs of processing applications, administering permit programs, and conducting inspections to ensure compliance with pollution control permits issued.

The law in North Carolina provides that a maximum application fee of \$100 may be charged for water pollution, air pollution, oil pollution, and hazardous substance control permits. No provision is made for an additional charge to cover expenses incurred in administering these permits or inspections conducted to ensure compliance with permit terms and State pollution control standards. As a result the revenue generated by fees charged to those securing permits covers only a small percentage of the costs incurred by the State's pollution control permit programs. For example, only one percent of the costs expended to process applications, administer and enforce wastewater discharge permits is recovered from application fees.

Because of the disparity between the funding for the Department of Natural Resources and Community Development based on current permit application fees charged and the funding actually needed to provide adequate personnel to process applications, administer permits issued, and enforce pollution control standards, the Department of Natural Resources and Community Development is

understaffed. There now exists a substantial backlog of permit applications to be processed. Inspections conducted by the Department of Natural Resources and Community Development to ensure that facilities with discharge permits are properly maintained and operated, are conducted too infrequently to adequately protect the State's natural resources. Additional personnel are needed.

Recommendations:

- (1) The General Assembly should increase to \$400 the maximum application fee for pollution control permits and allow an additional charge of no more than \$10,000 to cover the costs of administering and conducting compliance checks for those permits as set out in Appendix C.
- (2) The General Assembly should use the monies resulting from the revised fee scale to establish additional permanent positions to assist in processing applications, administering permits and conducting compliance checks for permits issued by the Department of Natural Resources and Community Development to protect water and air quality.

Finding 2: Improper maintenance and operation of package plants and some other types of treatment works, particularly if held in a form of multiple ownership, create serious water pollution problems that often require quick and expensive action without owner approval. The Committee found that in many instances the responsibility for the proper maintenance and operation of a package plant or of some other types of treatment works is not clearly defined because the system serves several dwellings or building units. When a permit violation occurs or a problem with

the treatment system develops, it may not be sanitary to delay remedial action until all responsible parties are contacted and then agree on an acceptable course of action. In other instances an owner may be located, but is unwilling to take the necessary action. In those situations remedial action must be initiated by either the Department of Natural Resources and Community Development or a local government, and the cost of that action is frequently borne by the State or local government, which may have been unaware of the existence of the treatment system until the problem arose.

Recommendation:

- (3) The General Assembly should require that an applicant requesting a discharge permit for specified types of waste treatment works, furnish a bond as a condition of the permit or, in lieu of a bond, provide an operational agreement between the applicant and appropriate local government in which the local government agrees to assume maintenance, operational, and financial responsibility for the treatment works at the direction of the Environmental Management Commission when there has been a permit violation. A proposed draft of this legislation appears in Appendix C.

Finding 3: The Committee found that the Haw River is considered by many to possess features that deserve the special attention and protection of the State. Segments of the Haw River are included in the National Park Service Nationwide Rivers Inventory, a list compiled by the National Park Service of rivers that may qualify for inclusion in the National Wild and Scenic River

System, and are also included in a list compiled by the State Parks and Recreation Division of rivers that may qualify for inclusion in the State Natural and Scenic Rivers System.

Recommendations:

- (4) The Department of Natural Resources and Community Development should immediately begin a study of the Haw River to determine whether that segment of the river that flows from Swepsonville to the Chatham County line qualifies for inclusion in the State's Natural and Scenic Rivers System.
- (5) The Committee endorses the efforts of Representative Bertha Holt and Senator Tim McDowell in seeking Natural and Scenic River status for the Haw River and offers to both of them the Committee's full support.

Finding 4: The location of a landfill near a major river or a major tributary may cause serious water pollution problems. The Committee recognized the possible threat to water quality posed by locating landfills in close proximity to major rivers or tributaries. The need to protect against pollution is particularly urgent if those rivers or tributaries are also utilized as a drinking water supply.

Recommendation:

- (6) The General Assembly should prohibit the location of a landfill within 2500 feet of a major river or major tributary as set out in Appendix C.

Finding 5: Water quality is a continuing concern of the State's citizens. New methods to detect pollution and innovative measures to protect water quality also continue to be developed. It is important that the General Assembly be apprised of the problems posed to the State's waters and of methods developed to address those problems and protect this valuable resource.

Recommendation:

- (7) The General Assembly should reauthorize this Study.

APPENDIX A

WATER QUALITY IN HAW RIVER AND
B. EVERETT JORDAN RESERVOIR
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GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 1985
RATIFIED BILL

CHAPTER 790
SENATE BILL 636

AN ACT AUTHORIZING STUDIES BY THE LEGISLATIVE RESEARCH COMMISSION, MAKING TECHNICAL AMENDMENTS THERETO, AND TO MAKE OTHER AMENDMENTS.

The General Assembly of North Carolina enacts:

- Section 1. Studies Authorized. The Legislative Research Commission may study the topics listed below. Listed with each topic is the 1985 bill or resolution that originally proposed the issue or study and the name of the sponsor. The Commission may consider the original bill or resolution in determining the nature, scope and aspects of the study. The topics are:
- (1) Continuation of the Study of Revenue Laws (H.J.R. 17-Lilley),
 - (2) Continuation of the Study of Water Pollution Control (H.J.R. 141-Evans),
 - (3) Adolescent Sexuality Teaching (H.J.R. 275-Jeralds),
 - (4) Continuation of the Study on the Problems of the Aging (H.J.R. 322-Greenwood),
 - (5) Continuation of the Study of Municipal Incorporations (H.J.R. 389-Greenwood),
 - (6) School Discipline (H.J.R. 861-Colton),
 - (7) Bail Bondsmen and Bail Bond Forfeiture (H.B. 967-Watkins),
 - (8) Preventative Medicine (H.B. 1052-Locks),
 - (9) Life Care Arrangements (H.B. 1053-Locks),
 - (10) State Personnel System (H.B. 1064-Wiser),
 - (11) Long-Term Health Care Insurance (H.B. 1103-Locks),
 - (12) Itinerant Merchants (H.B. 1170-Lancaster),
 - (13) Manufactured Housing Zoning (H.B. 1178-Ballance; S.B. 636-Plyler),
 - (14) Interest Rate Regulation (H.J.R. 1227-Evans),
 - (15) Underground Storage Tank Leakage Hazards and other ground water hazards (H.B. 1281-Locks),
 - (16) Mental Patient Commitments (H.J.R. 1313-Miller),
 - (17) High-Level Radioactive Waste Disposal (H.B. 1373-Diamont; S.B. 655-Hipps),
 - (18) Stun Guns (H.J.R. 1390-McDowell),
 - (19) Continuation of the Study of Water Quality in Haw River and B. Everett Jordan Reservoir (H.J.R. 1393-Hackney),
 - (20) Authority of Boards of County Commissioners in Certain Counties over Commissions, Boards and Agencies (H.J.R. 1405-Holroyd),
 - (21) Superintendent of Public Instruction and State Board of Education (H.J.R. 1412-Nye),
 - (22) Rental Referral Agencies (H.B. 1421-Stamey),
 - (23) Child Abuse Testimony Study (S.B. 165-Hipps),
 - (24) Home Schooling Programs (S.J.B. 224-Winner),
 - (25) Pretrial Release (S.J.R. 297-Winner),

- (26) Inmate Substance Abuse Therapy Program (S.J.R. 317-Plyler),
- (27) Inmate Work-Release Centers (S.B. 406-Swain),
- (28) Community College System (S.B. 425-Martin),
- (29) Community Service Alternative Punishment and Restitution (S.B. 495-Swain),
- (30) State Employee Salaries and Benefits (S.B. 514-Jordan),
- (31) State Infrastructure Needs (S.B. 541-Royall),
- (32) Commercial Laboratory Water Testing (S.B. 573-Taft),
- (33) Outdoor Advertising (S.B. 611-Thomas, R.P.),
- (34) Premium Tax Rate on Insurance Companies (S.B. 633-Hardison)
- (35) Continuation of the Study of Child Support (S.B. 638-Marvin),
- (36) Local Government Financing (S.B. 670-Rauch),
- (37) Medical Malpractice and Liability (S.B. 703-Taft),
- (38) Marketing of Perishable Food (S.B. 718-Basnight),
- (39) Child Protection (S.B. 802-Hipps),
- (40) Legislative Ethics and Lobbying (S.B. 829-Rauch),
- (41) Satellite Courts (S.B. 850-Barnes),
- (42) Substantive Legislation in Appropriations Bills (S.B. 851-Band),
- (43) School Finance Act (S.B. 848-Taft).

Sec. 2. Transportation Problems at Public Facilities. The Legislative Research Commission may identify and study transportation problems at public transportation facilities in North Carolina.

Sec. 2.1. The Legislative Research Commission may study the feasibility of the prohibition of investment by the State Treasurer of stocks of the retirement systems listed in G.S. 147-69.2(b)(6), or of the assets of the trust funds of The University of North Carolina and its constituent institutions deposited with the State Treasurer pursuant to G.S. 116-36.1 and G.S. 147-69.2(19) in a financial institution that has outstanding loans to the Republic of South Africa or in stocks, securities, or other obligations of a company doing business in or with the Republic of South Africa.

Sec. 3. Reporting Dates. For each of the topics the Legislative Research Commission decides to study under this act or pursuant to G.S. 120-30.17(1), the Commission may report its findings, together with any recommended legislation, to the 1987 General Assembly, or the Commission may make an interim report to the 1986 Session and a final report to the 1987 General Assembly.

Sec. 4. Bills and Resolution References. The listing of the original bill or resolution in this act is for reference purposes only and shall not be deemed to have incorporated by reference any of the substantive provisions contained in the original bill or resolution.

Sec. 5. The last sentence of G.S. 120-19.4(b) is amended by deleting the citation "G.S. 5-4" and inserting in lieu thereof the following: "G.S. 5A-12 or G.S. 5A-21, whichever is applicable".

Sec. 6. G.S. 120-99 is amended by adding a new paragraph to read:

"The provisions of G.S. 120-19.1 through G.S. 120-19.8 shall apply to the proceedings of the Legislative Ethics Committee as if it were a joint committee of the General Assembly, except that the chairman shall sign all subpoenas on behalf of the Committee.

Sec. 7. G.S. 120-30.17 is amended by adding a new subsection to read:

"(9) For studies authorized to be made by the Legislative Research Commission, to request another State agency, board, commission or committee to conduct the study if the Legislative Research Commission determines that the other body is a more appropriate vehicle with which to conduct the study. If the other body agrees, and no legislation specifically provides otherwise, that body shall conduct the study as if the original authorization had assigned the study to that body and shall report to the General Assembly at the same time other studies to be conducted by the Legislative Research Commission are to be reported. The other agency shall conduct the transferred study within the funds already assigned to it."

Sec. 8. This act is effective upon ratification.

In the General Assembly read three times and ratified, this the 18th day of July, 1985.

ROBERT B. JORDAN III

Robert B. Jordan III
President of the Senate

LISTON B. RAMSEY

Liston B. Ramsey
Speaker of the House of Representatives

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 1985

HOUSE JOINT RESOLUTION 1393

Sponsors: Representatives Hackney; Earnes.

Referred to: Rules and Operation of the House.

June 18, 1985

1 A JOINT RESOLUTION TO AUTHORIZE THE LEGISLATIVE RESEARCH
2 COMMISSION TO CONTINUE THE STUDY OF WATER QUALITY IN THE HAW
3 RIVER AND B. EVERETT JORDAN RESERVOIR.

4 Be it resolved by the House of Representatives, the Senate
5 concurring:

6 Section 1. The Legislative Research Commission is
7 authorized to continue the study of water quality in the Haw
8 River and B. Everett Jordan Reservoir begun under Section 1(16)
9 of Chapter 905, Session Laws of 1983.

10 Sec. 2. The Legislative Research Commission may make an
11 interim report on the study authorized by this resolution to the
12 1985 General Assembly, Regular Session 1986, and may make a final
13 report to the 1987 Regular Session.

14 Sec. 3. This resolution is effective upon ratification.
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APPENDIX B

mostly county transportation maps. Also, with rare exceptions, there are no available before and after quads. What this office has done instead is to redo the development feature survey, upgrading it from county transportation maps to quad maps, and, as requested, produced development count sheets listing features per 1/4 mile segment.

Where possible, however, the Division has made a comparison between the latest quad maps and air photos and older quad maps in order to produce a limited before and after development feature analysis. Tables 1 and 2 list the quads for each river, their dates, and the dates of the latest ASCS aerial photography. Comparison time intervals range from 1 to 15 years. The results of these comparisons are both listed by river mile and broken out by development type for each 1/4 mile segment.

In conjunction with these tasks, enclosed are two sets of copies of annotated quad map sections for each river on which are included river miles (in large circles) and reference indicators for individual or clusters of development features. These development indicators appear as smaller circles bisected by a horizontal line. The upper number in each circle is the river mile. The lower number is the number of the individual or clustered development feature within the river mile segment.

Lines emanating from the reference indicator circles point to specific development features. In low development areas, each development feature such as a house, road ending, or open field is usually pointed out. In more densely developed areas, pointing lines may be directed at a village, a subdivision, or a group of features such as dwellings, roads and outbuildings.

Each development feature, or features, referenced on the quad map is then listed on the development count sheet preceded by it's reference indicator number (lower number in each circle). Since one reference indicator circle on the map may refer to several features, there is often more than one feature listed after it, particularly in high density development areas.

Features revealed by air photo interpretation have been drawn in on the quad map and marked by a half-shaded circle as noted in the following section.

2. Task (3): Field check the currency of the latest quads and update as necessary.

Selected segments of the Neuse and Haw Rivers have been field checked. These include Neuse River segments from RM 76.5 to RM 88 and RM 133.5 to RM 245.5 and Haw River

TABLE 1

"BEFORE AND AFTER" QUAD MAP AND ASCS AIR PHOTO
SUMMARY FOR THE NEUSE RIVER

<u>QUAD MAP (RIVER MILES)</u>	<u>DATE</u>	<u>REVISED DATE</u>	<u>ASCS DATE</u>	<u>COMPARISON INTERVAL (YRS)</u>
Askin (48 - 48.8)	<u>1978</u>	<u>1983</u>	April, 1981	5
Jasper (48.8 - 55.7)	<u>1978</u>	<u>1983</u>	April, 1981	5
Vanceboro (55.7 - 57.9)	1983	----	April, 1981	-
Ft. Barnwell (57.9 - 67.3)	1983	----	April, 1981	-
Grifton (67.3 - 76.8)	1983	----	April, 1981	-
Kinston (76.8 - 81.5)	1983	----	April, 1981	-
(84.6 - 88.75)				
Rivermont (81.5 - 84.6)	1980	----	<u>April, 1981</u>	1
Falling Creek (88.75 - 89.5)	1983	----	April, 1981	-
Deep Run (89.5 - 100.5)	1980	----	<u>April, 1981</u>	1
Seven Springs (100.5 - 108.6)	<u>1980</u>	----	<u>April, 1981</u>	1
Williams (108.6 - 110.3)	<u>1980</u>	----	<u>April, 1981</u>	1
SE Goldsboro (110.3 - 126.6)	1982	----	April, 1981	-
NW Goldsboro (134 - 135.5)	----	----	April, 1981	-
SW Goldsboro (126.6 - 134.0)	* <u>1974</u>	----	<u>April, 1981</u>	7
(135.5 - 137.5)				
Grantham (137.25 - 144.4)	* <u>1974</u>	----	<u>April, 1981</u>	7
Princeton (144.4 - 151.7)	* <u>1974</u>	----	<u>April, 1981</u>	7
Four Oaks NE (151.7 - 166.3)	1980	----	April, 1981	1
Four Oaks (166.3 - 166.5)	1980	----	April, 1981	1
Powhatan (166.5 - 167.1)	*1964	1981	April, 1981	-
Selma (167.1 - 179.1)	1964	* <u>1973</u>	<u>April, 1981</u>	8
Flowers (179.1 - 180.25)	1964	* <u>1973</u>	<u>April, 1981</u>	8
Clayton (180.25 - 192.3)	1964	* <u>1973</u>	<u>April, 1981</u>	8
Garner (192.3 - 195.5)	1964	* <u>1973</u>	<u>April, 1981</u>	8
Raleigh East (195.5 - 199)	* <u>1968</u>	<u>1981</u>	April, 1981	13

* Indicates quad maps available for 1977 Nationwide Rivers Inventory

_____ Underlined dates are those used for comparison intervals

TABLE 2

"BEFORE AND AFTER" QUAD MAPS AND ASCS AIR
PHOTO SUMMARY FOR THE HAW RIVER

<u>QUAD MAP (RIVER MILES)</u>	<u>DATE</u>	<u>REVISED DATE</u>	<u>ASCS DATE</u>	<u>COMPARISON INTERVAL (YRS)</u>
Bynum (15 - 24.9)	<u>1968</u>	----	<u>April, 1983</u>	15
Silk Hope (24.9 - 26.3)	<u>1974</u>	----	<u>April, 1983</u>	9
White Cross (26.3 - 26.5)	<u>1968</u>	<u>1981</u>	<u>April, 1983</u>	13
Saxaphaw (26.5 - 37.8)	<u>1977</u>	----	<u>April, 1983</u>	6
Mebane (37.8 - 45.75)	<u>1969</u>	----	<u>April, 1982</u>	13
Burlington (45.75 - 48.5)	<u>1969</u>	<u>1981</u>	<u>April, 1982</u>	12
Lake Burling (48.5 - 57.2)	<u>1969</u>	----	<u>April, 1982</u>	13
Ossipee (57.2 - 65.8)	<u>1970</u>	----	<u>April, 1982</u>	12
Williamsburg (68.5 - 72.75)	<u>1972</u>	----	<u>April, 1982</u>	10
Reidsville (72.75 - 81.9)	<u>1972</u>	----	<u>April, 1982</u>	10
Bethany (81.9 - 88.2)	<u>1971</u>	----	<u>April, 1982</u>	11
Lake Brandt (88.2 - 90.3)	<u>1951</u>	<u>1968</u>	<u>April, 1982</u>	14
Summerfield (90.3 - 93)	<u>1969</u>	----	<u>April, 1982</u>	13

_____ Underlined dates are those used for comparison intervals.

segments from RM 27.5 to RM 33.5 and RM 66 to RM 71 as well as most of the bridge crossings. Field trip reports are included for review. In addition, both rivers were checked and updated using the latest ASCS aerial photographs. Air photo dates for both rivers are listed below by county:

<u>Neuse River</u> (County/Date)		<u>Haw River</u> (County/Date)	
Craven	1981/1982	Chatham	1982
Lenoir	1980	Alamance	1982/1983
Wayne	1981	Guilford	1982
Johnston	1981	Rockingham	1982
Wake	1981		

Recent development features identified by field checking or air photo interpretation are indicated on the quad maps by a reference indicator circle that has had the lower half shaded in. These features are listed on the development count sheet within their appropriate quarter mile segment but are preceded by an asterisk instead of a reference number.

Field checking the entire reach of both rivers, though ideal, was not done not only to save time on this phase of the project but to be consistent with field checking on the remaining 68 NRI rivers in Phase II. There are 2654 NRI river miles in this state, 210 of which are included in the Haw and Neuse Rivers. If the remaining 2454 miles could be field checked at a rate of 10 miles per date (optimistic), it would take 49 weeks to accomplish just the canoeing. Travel time to distance parts of the state could take several more weeks, and travel expenses would be high. With this in mind, the Division feels selective field checking is in order. This would be most appropriately done after updating development information on the river through quad maps, air photos and possibly permit information and local planning input. Actively growing areas, major facility sites, special resource segments, etc would be good candidates for field checking.

3. Task (4): Break out individual development types.

This task has been completed for each 1/4 mile segment of both rivers on two-page charts derived from Maine's Landscape Corridor Development Sheet. Most items are tabulated simply by the number of occurrences per quarter mile segment, but some, such as parallel powerlines and villages/towns, are given as river mile lengths. Several major features such as a large military airport, power plant or factory have been added to the list. Other special features may be added as more rivers are examined

A separate list of "before and after" development features described in item 1 is also included.

Items on page 2 of each set of sheets have been circled simply to be more easily read. The items on page two generally occur less frequently than those on page one and could be easily overlooked unless highlighted in some fashion.

4. Task (5): Collect all relevant permit data from various regulator agencies for affected river segments in the NRI (i.e. Federal, State and Local permits covering modifications to the waterway and shoreline).

Based on the overall objectives of this project (per Article II of the Agreement) and discussions with NPS officials Bern Collins (WASO), Bill Spitzer (WASO) and Sharon Keene (SERO), the apparent intent of this task is to gather permit data for the affected river segments for the nine year time period from 1977 to the present. This information could then be compared with the findings of tasks of 1, 2 and 3 which were to reveal through examination of quad maps and field checking what development has occurred over the same time period. The two sets of information could be compared to determine their relative accuracy. Ideally, the effort would uncover several key types of permit data that were relatively easy to obtain, correlated well with the occurrence of development and could serve as an accurate and reliable indicator for monitoring development and conservation actions on NRI rivers.

While the idea of potentially substituting permit data analysis for map/photo interpretation and fieldwork as a means of river development monitoring is attractive in several ways, it also has some major shortcomings. On the plus side, the information would be up-to-date, accurate, and very easy to obtain if the permitting agencies were willing to provide the information. In actuality, however, we encountered some difficulties.

Tables 3a, 3b and 3c provide a complete list of the development features on the Haw and Neuse Rivers. More importantly, they also reveal the frequency of occurrence of the features based on the number of river miles where any given feature occurs at least once. As an example, one or more dwellings occur at 28 river miles of the Haw River. This represents 36.4% of the river's total 77 miles.

As it turns out, dwellings happen to be the mostly widely distributed development feature and one that can have considerable impact on the river's character both singly, if particularly conspicuous, or in aggregate.

TABLE 3A

FREQUENCY OF OCCURRENCE OF DEVELOPMENT FEATURES ALONG
THE HAW RIVER (BASED ON THE NUMBER OF RIVER MILES
WHERE A FEATURE OCCURS AT LEAST ONCE)

<u>FEATURE</u>	<u>*RIVER MILES TOTAL/NEW</u>	<u>% OF TOTAL RIVER SEGMENT (77 MILES)</u>
1. Dwellings	29/1 miles	37.7 %
2. Bridges - 2 Lane	25	32.5
3. Paved Road Encroach	20/1	26.0
4. Unpaved Road Ends	18/1	23.4
5. Outbuildings	17	22.0
6. Powerline Crossings	10/3	13.0
Subdivisions	10/5	13.0
8. Unpaved Road Encroachments	9	11.7
Primitive Road Ends	9	11.7
10. Dams/Impoundments	8	10.4
11. Paved Road Ends	7	9.1
Municipalities	7	9.1
Primitive Road Encroach	7	9.1
Churches	7	9.1
15. Powerlines - Parallel	6/2	7.8
16. Primitive Roads - Par	5	6.5
Factories	5	6.5
18. Pipelines - Buried	5	5.2
Sewage Treatment Plants	4	5.2
20. Farms	2	2.6
Railroad Bridges	2	2.6
Water Storage Tanks	2	2.6
4 - Lane Road Bridges	2	2.6
24. Country Clubs	1	1.3
Gaging Station	1	1.3
Cemetary	1	1.3
Schools	1	1.3
Small Tributary Res.	1	1.3
Developed Rec. Area	1	1.3
Surface Mine	1	1.3

* Total refers to total number of river miles in which the feature occurs including new features. New refers to features discovered in "before and after analysis".

TABLE 3B

FREQUENCY OF OCCURRENCE OF DEVELOPMENT FEATURES ALONG THE NEUSE RIVER
(BASED ON THE NUMBER OF RIVER MILES WHERE A FEATURE OCCURS
AT LEAST ONCE)

<u>FEATURE</u>	<u>*RIVER MILES TOTAL/NEW</u>	<u>% OF TOTAL RIVER SEGMENT (151 MILES)</u>
1. Dwellings	53/3	35.1 %
2. Unpaved Road Ends	52/3	34.4
3. Paved Road Encroachments	28	18.5
4. 2 Lane Bridges	24/-1	16.5
5. Outbuildings	24/2	15.9
6. Unpaved Road Encroachments	23/2	15.2
7. Paved Road Ends	17	11.2
8. Powerline Crossings	14/3	9.3
9. Primitive Road Ends	10	6.6
Paved Boat Ramps	10/4	6.6
11. Surface Mines	9	5.9
12. Unpaved Roads - Parallel	8	5.3
Subdivisions	8/5	5.3
14. Lagoons (Sewage, Cooling, Tailing Pond)	7	4.6
15. Cemeteries	6	4.0
16. Railroad Bridges	5	3.3
17. Powerline Encroachments	4	2.6
Municipalities	4	2.6
19. Large Outfalls	3/3	2.0
Railroad Endings	3	2.0
Sewage Treatment Plants	3	2.0
22. Gaging Station	2	1.3
Pipeline Crossing (Buried)	2	1.3
Railroad - Parallel	2	1.3
Powerline - Parallel	2	1.3
Small Tributary Res.	2	1.3
Developed Rec. Area	2	1.3
Dams - Small	2/1	1.3
29. Primitive Road Parallel	1	0.7
Fire Tower	1	0.7
Schools	1	0.7
Paved Road Parallel	1	0.7
Rip Rap	1/1	0.7
Penal Institution	1	0.7
Power Plant	1	0.7
Traylor Park	1	0.7
Factory (Pulp Mill)	1	0.7
Large Airport	1	0.7

* Total refers to total number of miles in which the feature occurs including all new features. New refers to features discovered in "before and after analysis".

TABLE 3C

COMBINED FREQUENCY OF OCCURENCE OF DEVELOPMENT FEATURES ALONG
THE NEUSE AND HAW RIVERS, AND POTENTIAL DATA SOURCES

<u>FEATURE</u>	<u>*RIVER MILES TOTAL</u>	<u>% OF TOTAL RIVER SEGMENT (228 MILES)</u>	<u>*POTENTIAL DATA SOURCES</u>
1. Dwellings	82	36.0 %	A, B, D
2. Unpaved Road Endings	70	30.1	A, B, C, D
3. Road Bridges	49	21.5	A, B, C, E
4. Paved Road Encroachments	48	21.0	A, B, C
5. Outbuildings	41	18.0	A, B, D
6. Unpaved Road Encroachments	31	13.6	A, B, C
7. Powerline Crossings	24	10.5	A, B, D
8. Primitive Road Ends	19	8.4	A, B, D
9. Subdivisions	18	7.9	A, B, D, E, F
10. Municipalities	11	4.8	A, C, E
11. Surface Mines	10	4.4	A, B, F
Paved Boat Ramps	10	4.4	A, B, D, G
Dams - Small	10	4.4	A, B, C, E
14. Unpaved Roads - Parallel	8	3.5	A, B, C, D
Primitive Road Encroachments	8	3.5	A, B
Powerlines - Parallel	8	3.5	A, B, D
17. Cemeteries	7	3.1	A, B, D
Lagoons	7	3.1	A, B, D
Railroad Bridges	7	3.1	A, B, C
Sewage Treatment Plants	7	3.1	A, B, E, F
Churches	7	3.1	A, B, C
22. Pipeline Crossings	6	2.6	A, B, D
Primitive Roads - Parallel	6	2.6	A, B, D
Factories/Mills	6	2.6	A, B, D, E, F
25. Powerline Encroachments	4	1.7	A, B, D
26. Outfalls	3	1.3	A, D, F
Railroad Endings	3	1.3	A, B, C
Gaging Station	3	1.3	A
Small Tributary Reservoirs	3	1.3	A, B
Developed Rec. Areas	3	1.3	A, B, C, E, F
31. Railroad - Parallel	2	0.9	A, B, C, D
Schools	2	0.9	A, B, C, D
Water Storage Tanks	2	0.9	A, B, D
Country Club/Golf Course	2	0.9	A, B, D
35. Fire Tower	1	0.9	A, D
Paved Road - Parallel	1	0.9	A, B, C, D
Rip Rap	1	0.9	A
Penal Institution	1	0.9	A, C
Power Plant	1	0.9	A, B, D, E, F
Trail Park	1	0.9	A, B, D, E, F
Airport	1	0.9	A

* A - Quad Maps

B - Aerial Photography

C - County Highway Maps

D - Field Checking

E - Local Planning Department

F - State Permit Programs

G - Division of Parks and Recreation

Unfortunately, there are 16 municipal and county governments along the two rivers and none, with the exception of Guilford County, plots the locations of dwelling building permits. In order to determine the number and location of dwelling building permits within 1/4 mile of the rivers, every permit must be examined individually at each of the government offices. After first establishing whether a given permit is for a new home or building (versus an addition, etc.) then the location must be determined. Most of the permits provide scant information on location other than a street address. Getting an accurate location for each permit would be very time consuming. When viewed on a statewide basis, NRI rivers occur in 76 counties and perhaps have half again as many municipalities.

As an alternative, the Division recommends that dwellings and outbuildings be located from quad maps combined with the most recent available aerial photography. The most complete source of relatively current, statewide aerial photography is the US Department of Agriculture's Stabilization and Conservation Service (ASCS). Most of their photography is flown at least every seven years and is scheduled for 5 year intervals in the future. It was also recently learned that some of the county governments have their own aerial photography which is more current. Where available, this would be an excellent source for locating dwellings as well as most other development features. Visits to county offices could be combined with field trips to nearby rivers. Some counties also have developed subdivision regulations. Where these exist, the county will probably map the subdivision locations - another source to check at their offices.

A second major category of features is roads, bridges and railroads. In aggregate these actually occur more widely than dwellings. Most roads, however, can be readily inventoried using county transportation maps which are updated almost annually. Non-state maintained roads, though, would not be located on these maps and would again be difficult to locate through any permit process. Aerial photography will probably be the best source for locating these features.

A third major development feature category is power lines which occur along about 10% of the river miles. These are readily discerned from aerial photographs though some care needs to be taken to avoid confusion with pipelines. Since pipelines are uncommon, however, and most can be identified from quad maps, this is not considered a major problem.

A fourth category of features is mines. Though the Haw River features only one inactive quarry (which is now

part of a golf course), the Neuse has 9 sand and gravel mines clustered in and around Goldsboro and Kinston. Mine permits are easily located on county maps maintained by the mine permits section of the North Carolina Division of Land Resources. Active mines have been identified on the quad maps along with their permit numbers.

Municipalities and their populations are presented on the county transportation maps. Villages, towns and cities serve as nodes of development. As will be discussed more thoroughly in the pre-test section, below, new development occurs most frequently in close proximity to municipalities.

Dams, which occur infrequently on the Neuse, but are common on the Haw, are an important, but readily identified feature on quad maps and air photos. In fact, many of the remaining features which occur infrequently but have a significant impact on rivers such as factories, power plants, sewage treatment plants and airports can be readily identified from quad maps and air photos. Those major features that have been developed subsequent to the latest air photos can usually be identified by two remaining sources, local planners and discharge permits.

City and county planners are an excellent source of information. While they may not be able to pinpoint the location of a new dwelling, they are usually aware of larger development features, particularly those recently developed. A dam or riverfront power plant, subdivision, factory, sewage treatment plant, office complex, etc. is seldom permitted without some degree of controversy and publicity. They can also identify local growth trends which would be of value in river management.

A final development source filter is discharge permits issued by the North Carolina Division of Environmental Management (DEM). Permit locations are mapped and can be used to identify package treatment plants, often associated with riverfront mobile home parks and subdivisions, as well as large facilities such as office parks and "wet" industries.

The Corps of Engineers, though a logical source of river permit data, has yet to respond to the Division's request for information.

III. Proposed NRI Update Procedure

A. Rethinking the Objectives

The underlying objective of this first phase in updating the NRI is to develop a low cost, reliable method for monitoring development and conservation actions on North Carolina's NRI rivers with possible regional or nationwide application. It is apparent from the preceding section that the use of permits alone, at least in North Carolina, is not a viable method. It is the Division's opinion that the best sources of updating are mapped materials, aerial photographs and limited permit data supplemented by selective field checking and input from local officials familiar with their rivers and local growth trends.

The maps, photographs and permit data are easily obtained, centrally located, and provide perhaps 95% of the information needed for updating. County planners can be relied on to fill in development data gaps for significant residential or commercial growth, and perhaps more importantly, can provide insight into future development trends. Recent county aerial photography, where available, should also be utilized.

B. Differentiating Wild, Scenic, and Recreational Rivers

In addition to relying on the above sources for updating, it is recommended that an effort be made to identify each river mile as wild, scenic or recreational (based on the NPS guidelines and aided by development index scores derived from Maine's Landscape Corridor Development Sheets).

This information will be useful in a number of ways:

- o The information, if properly presented, will give the user an immediate sense of the river's character, since the basis for differentiating these segments is based largely on the degree of development.
- o Segments of special concern can be more easily identified.
- o Future management efforts of the rivers will be greatly facilitated.
- o The status of the river can be described in a manner directly relevant to the intent of the Wild and Scenic River enabling legislation. Statistics can be generated to reflect river miles of wild, scenic and recreational rivers.

- o The significance of potential development impacts on conservation efforts can be better assessed. Again, statistics could be generated to reflect wild, scenic or recreational river miles threatened (or possibly saved or upgraded).

It is understood that the official procedure for differentiating a river into wild, scenic or recreation segments requires review by a study team during the formal review process for designating a wild and scenic river, however, even an unofficial differentiation, or approximation, at this stage would be extremely useful.

The procedure used by this office to differentiate the three river types is a combination of the guidelines developed by NPS (presented in the Federal Register: Vol. 47, No 173/ Tuesday, September 7, 1982) and development index scores derived from the landscape corridor development sheets. The index is derived by counting the number of each development type in a given river mile, assigning it a value or score, and then totalling combined score of all features for a given river mile. As an example, each dwelling is assigned a score of 5, bridges 18, and small dams 40. A river mile containing one of each of these features would have a development index score of 63. The criteria used for determining wild, scenic and recreational status are outlined below.

Wild River - A development index score of 10 or less. This precludes any development feature with a score of 11 or greater such as a bridge or small dam. Timbering activity or unpaved road endings at the river would also eliminate a river mile from wild river consideration. If however, a river mile receives a score a few points in excess of 10 on the basis of 3 dwellings or an unpaved road or two located away from the river, the segment could be considered wild if river mile segments to either side qualify as wild.

Scenic River - A development index score of 11 to 50. This score is rather arbitrary but is useful as a guideline. Actual scenic quality depends on what is experienced on the river (visual quality, noise, odors). A score of 50 in the absence of a dam will generally qualify. It should be noted, however, that scores well in excess of 50 could, in actuality, still qualify as scenic if the development features are screened or not noticeable from the river, or if they blend in with the character of the river landscape.

Recreational River - For this study, any river segment included in the NRI with a score in excess of 50 was considered qualified. The upper limits of this category are difficult to discern, however, since based on a review of the subject NRI rivers, there is great latitude. The Neuse River includes river segments featuring a power plant (which is not only unattractive but able to be heard for miles in either direc-

tion), and a major military airport. The Haw includes a developing 21 mile reach of the river featuring six dams, six towns and eight bridges.

C. Procedure for updating the remaining 68 NRI rivers

The following procedure was used to update the Neuse and Haw Rivers and may be used on the remaining rivers to get a comprehensive inventory of development features.

1. Obtain most recent quad maps and compare with previous quads used in earlier update efforts if available. Photo revisions in the recent quads are shown in purple making them easy to identify. List all development features as well as keep a list of new features. Assign a reference number to all inventoried development items. Mark river miles on quad maps.
2. Obtain (borrow) most recent ASCS and/or county aerial photography. Compare with quads maps and edit maps where changes have occurred. Changes should be neat and annotated for the benefit of future reviewers who will probably have no familiarity with this effort. Make notes on difficult-to-identify items for possible field checking or questions to the local planning office. Keep list of changes per 1/4 mile segment.
3. Obtain (borrow) most recent county transportation maps to make sure all highways, bridges, and railroads are accounted for. Also check municipal limits and populations. List changes per 1/4 mile segment.
4. Gather permit information for waste discharge and mine permits. Compare locations with mapped and photographed features to ensure that major facilities associated with these permits have been accounted for. Also note whether old permits, mining permits in particular, are still active. Some will have probably been deactivated. Note locations and permit numbers on quad maps.
5. Contact local planning officials, or their counterparts, in cities and counties along the rivers. Find out where and what type of development has been occurring along the river in their jurisdictions. Ask questions regarding difficult-to-identify features that were seen in air photos. Find out where future development is expected. Also, get status on latest land use regulations, if any, that have been imposed along the rivers.
6. Determine whether field checking appears necessary and, if so, along which river segments. Conduct field checks and list new development features by 1/4 mile. Add features to quad maps.

7. Compile complete list of new development features based on items 1 through 6, above, for each quarter mile segment. All new features should be added to the quad maps.
8. Breakout development types for all inventoried features on the Landscape Corridor Development sheets for quarter mile segments. Also do a breakout for the "New" development features.
9. Tabulate development index scores for each mile segment using the development feature scores on the Landscape Corridor Development Sheets (eg. dwelling - 5, paved road bridge - 18, small dam - 40). List scores on the development count sheet. Tabulate scores for both all inventoried features and the new features.
10. Differentiate river mile segments into wild, scenic or recreational based on criteria outlined in subsection B above. Identify minor segments of 3 or more consecutive river mile segments of like designation. Identify major segments of five miles or more of like designation. At this point, an assessment can be made, using the planners assessments of growth trends and the findings of item 7 above, to determine the relative threat of growth and development on the wild, scenic and recreational status of the river. Three categories are suggested:

High - River segments where sufficient development is expected to occur over the next 5 years to either downgrade the status of the effected wild, scenic or recreational segment or eliminate it from the NRI.

Moderate - Some development is expected in the next five years that might downgrade isolated mile segments though overall impacts may be minor.

Low - Areas where growth has been, and is expected to continue to be, very low or nonexistent and where the status of the river is not expected to change significantly in the next 5 years.

D. Putting it all together

Figures 1 and 2 graphically summarize the findings of the development inventory. With some brief explanation, the reader should be able to interpret much information for him/herself.

The left edge of each graph represents the downstream end of the NRI portions of the rivers. Across the bottom of the page are municipalities and their populations (from 1984 county highway maps). Just above the cities and towns are major development features denoted by symbols,

FIGURE 1. HAW RIVER DEVELOPMENT SUMMARY

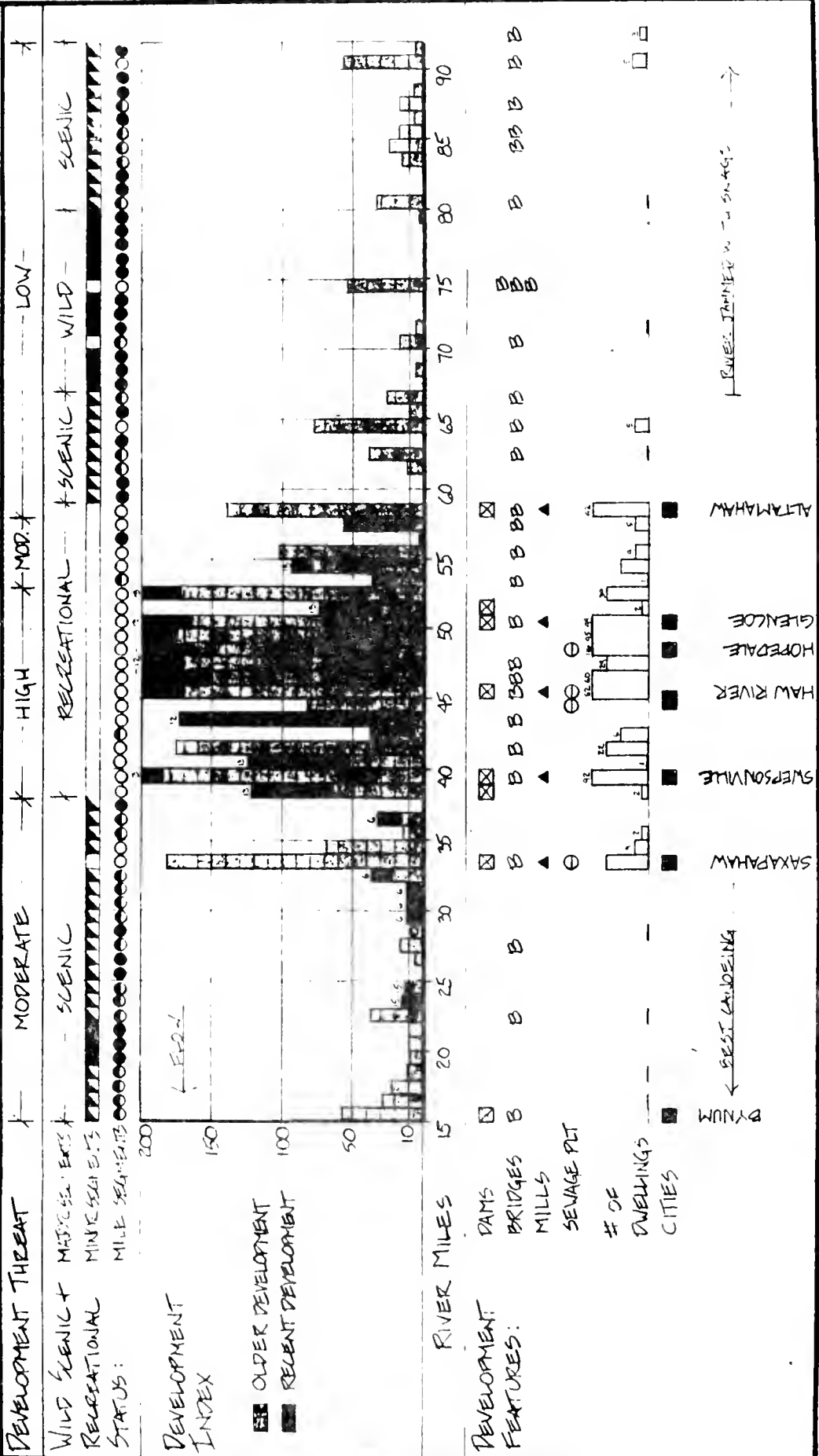


FIGURE 2. NEUSE RIVER DEVELOPMENT SUMMARY (SHEET 1 OF 2)

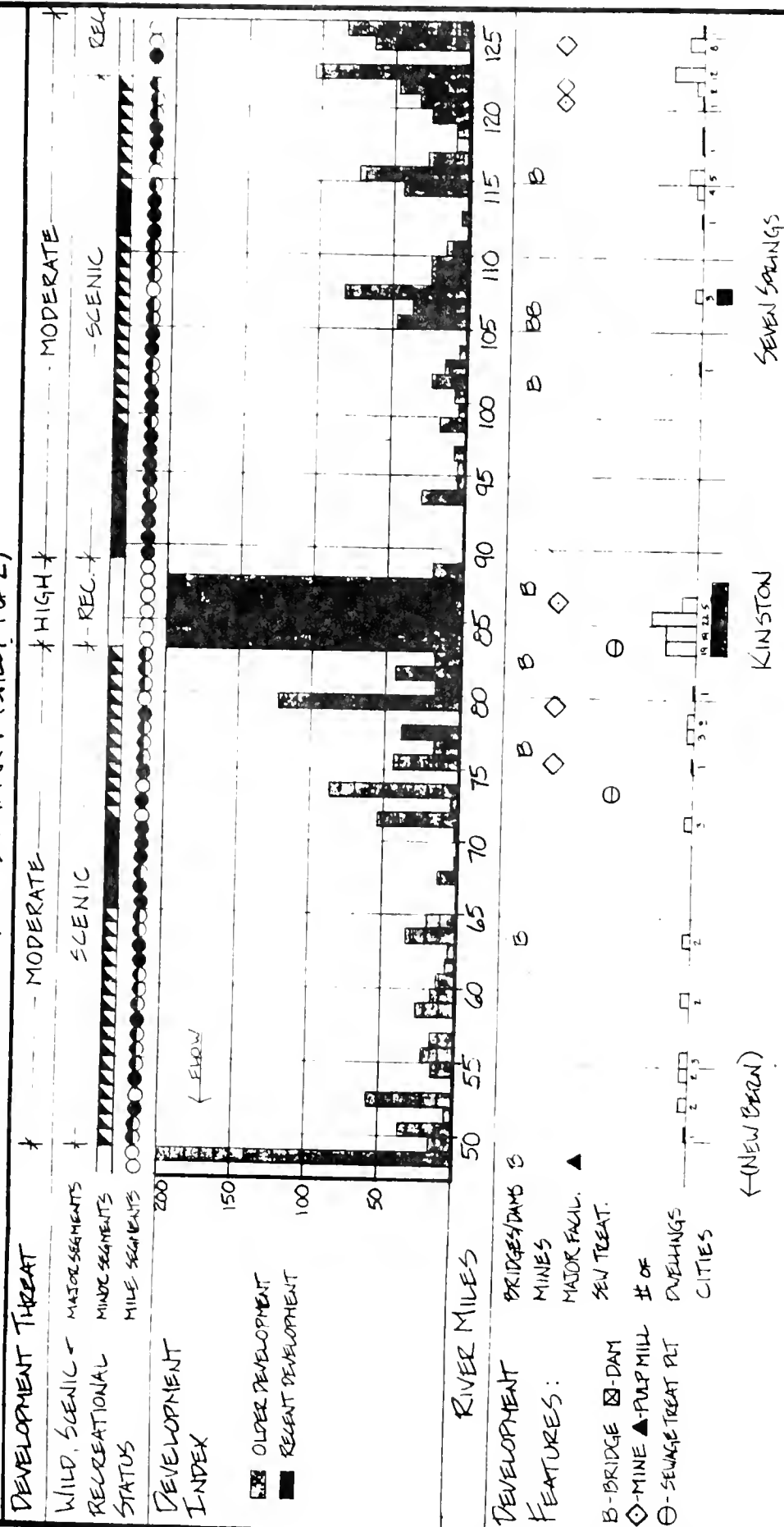
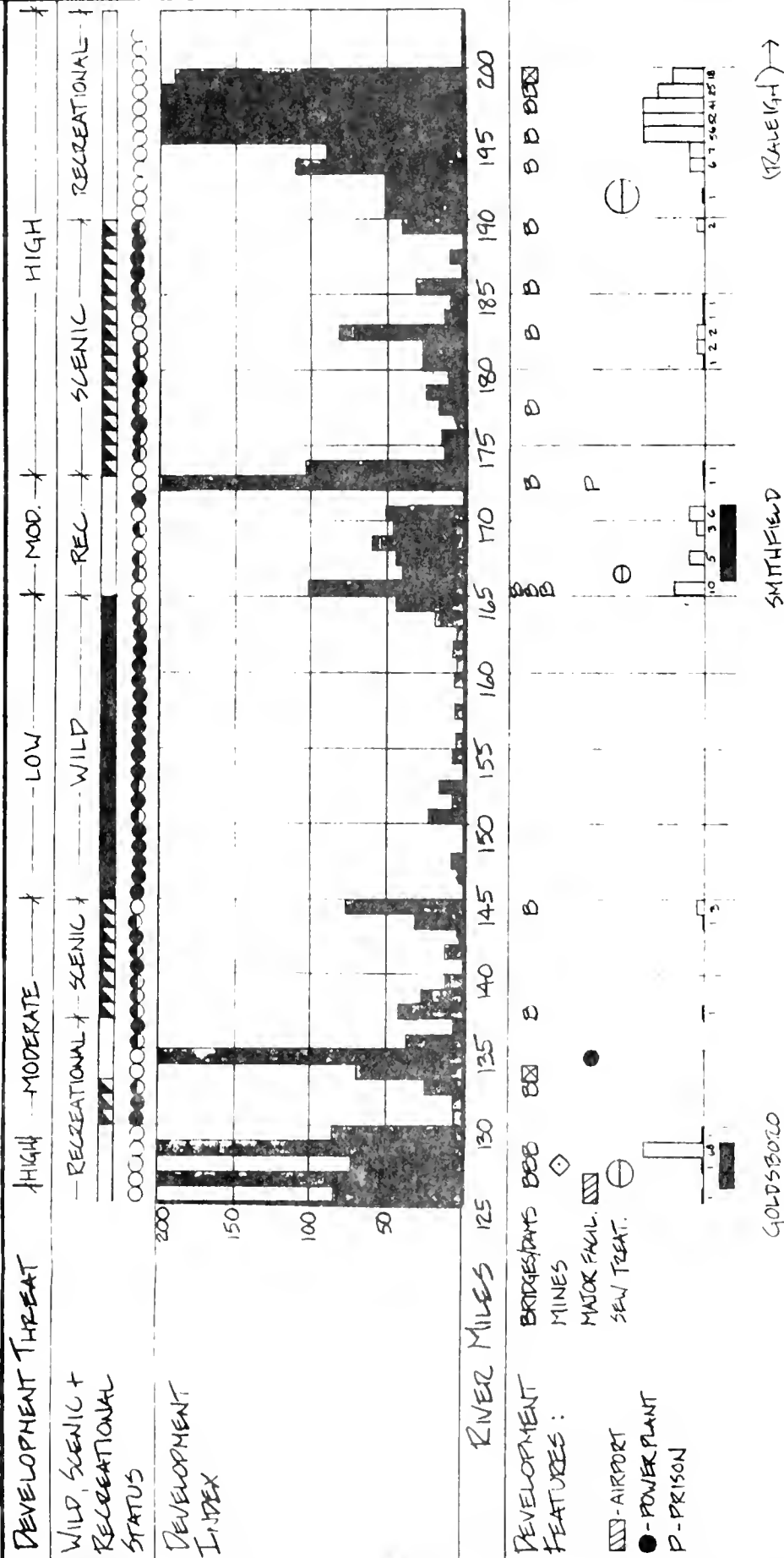


FIGURE 2. CONTINUED (SHEET 2 OF 2)



and, like the municipalities, they are located in line with their corresponding river mile location.

The graph, itself, presents the development index scores calculated in item 8 of the update procedures described in C above. The darkened portions of the graphed scores represent development changes since the last quad maps were produced. The number located just above the darkened area represents the time interval over which the development occurred.

The row of circles above the graph represents mile long wild (fully shaded), scenic (half shaded) and recreational (unshaded) segments. Minor segments consisting of joining together a minimum of 3 mile segments of like status are just above the circles. They in turn are topped by major segments consisting of 5 or more mile segments. At the top of the page are development threat ratings of high, low, or moderate described in subsection C above.

The Haw River (Figure 1) is a piedmont stream with sufficient flow and fall to drive mill wheels and generate hydropower. It is heavily bridged and is dotted by a number of small mill towns each of which features a dam used to harness the river's energy. While several of the mills are no longer functional, due in part to the local decline of the textile industry, some of the dams are used to generate hydropower.

The 70 mile NRI segment of the river can be divided into 3 major subsegments which are evident from a glance at the graph. There is a heavily developed mid-segment identified by the spikes in the graph and the unshaded recreational river segments across the top. Note the concentration of dams, mills, sewage treatment plants, and dwellings. To either side are relatively undeveloped segments, portions of which feature class I to IV rapids that are heavily used by canoeists despite the river's relatively poor quality. The most popular canoe stretch is below Saxapahaw (RM 33) to Bynum (RM 15). Canoeing also occurs between Haw River and Saxapahaw (RM 40 to 33) and upstream from Altamahaw (RM 59) to about river mile 67. Above RM 67, however, the river is so jammed with snags that it is useless for recreational boating.

Most recent development along the Haw has occurred in the Swepsonville to Glencoe corridor (RM 40 to RM 50) consisting mainly of residential development. This has historically been the most heavily developed segment and will continue to be so. The Alamance County planner advised that a new sewer line is being run from Swepsonville upstream to NC 54 which will continue to fuel growth in this section. Much of the growth is associated with the

growing City of Burlington (pop. 37,266) which has annexed land out to the river between Haw River and Hopedale.

Development pressure in the form of residential subdivisions is surfacing in the relatively undeveloped downstream segment from Bynum to Saxapahaw. County planners in Chatham County are attempting to limit densities in their jurisdiction (RM 15 to RM 22) within 1/2 mile of the river to 1 dwelling per 5 acres. However, there are no such land use controls being looked at upstream. Also, of note, 5 wild river mile-long segments have been downgraded to scenic river status from RM 24 to 32 due to timbering and powerline crossings. Development upstream from Altamahaw (RM 59) is expected to be minimal.

The Neuse River (Figure 2), in contrast with the Haw, is a broad sluggish coastal plain river with the exception of a few small piedmont-like rapids located upstream from Smithfield. Historic useage of the Neuse, unlike the Haw, had been as a transportation corridor. Barges would transport passengers and goods from New Bern (located just a few miles downstream from the lower end of the subject NRI segment) up to Smithfield with intermediate ports at Kinston (RM 83 to 88) and Goldsboro (RM 126 to 128). The development patterns established during those times (pre 1900) continue on today and are reflected in the development index graph.

The river's graphed development pattern appears as a series of 4 large spikes, each several miles in width, interspersed by relatively undeveloped segments. The spikes occur at Kinston, Goldsboro, Smithfield and at the extreme upper end near the City of Raleigh (pop. 160,000 +) where growth is extremely rapid. Note that most of the high development scores at the upper end have resulted from recent residential development. Most of the intervening, relatively undeveloped segments pass through farmland and are buffered by a wooded floodplain. The segment below Smithfield (RM 145 to RM 164) is particularly remote passing through low woodlands up to 1 or 2 miles wide. The major threat to this reach is from clearing, draining, and farming. Aerial photographs reveal substantial agricultural/timbering activity in this area.

While much of the Neuse River corridor has remained undeveloped in the past, except in and around the major cities, that situation may be changing. People are willing to live farther from the cities, and the river-front lands, historically left undeveloped due in part to poor soils, are being opened up by the wider availability of municipal waste treatment. This will be particularly true upstream from Smithfield to Raleigh. And of course the cities will continue to expand their borders.

On the bright side, however, several of the municipalities are rediscovering the river as a fine recreational resource. Kinston is in the process of developing a major river park system that will offer canoe rentals and waterfront trails. The city is also attempting to spruce up the river's appearance. It is recommended that the Kinston segment previously disqualified from the NRI (RM 83 to RM 88) be added based on these efforts and on a site evaluation by the Divisions staff.

The City of Raleigh, as well as adjoining Wake County, are considering options for preserving the river's natural character in their jurisdictions. Surprisingly, despite the high development index scores near Raleigh from RM 94 to 200, very little of this development is visible from the river.

IV. Conclusion and Recommendations

The procedure outlined in Section III and utilized in the pretesting has resulted in producing a detailed, comprehensive inventory of development features along the Neuse and Haw Rivers. A large volume of raw development data has been generated and is ready for manipulation by NPS computers.

The Division is confident in the completeness and accuracy of this effort and feels that it was necessary in order to provide a solid base for future updating efforts. Having identified all of the development features on quads, including addition of those features gleaned from other sources, updating of these rivers in the future should be considerably easier since there would be no need to completely reinventory the river. Instead, it might be possible to just key on several indicator features such as the number of dwellings and subdivisions, and the growth rate of municipalities. Such an analysis should also include a search for major new development features such as dams, industry, bridges and shopping centers. It is also hoped that the "before and after" analysis will be helpful in designing future updating efforts on these rivers.

In regard to the remaining 68 rivers, it is recommended that a similar updating effort be undertaken, particularly in coastal plain counties where many quads are still being produced (though orthophoto quads are available). This suggests that the updating effort for the remaining rivers start in regions of the state where quad maps are available and leave to the end the southeast coastal plain counties in hopes that more quads will be produced by the time they are inventoried.

The Division also recommends that the following river segments be added to the NRI per findings in Section III.D above.

Haw River: A 7 mile segment from river mile 22 at the Chatham County Line downstream to the dam at Bynum at river mile 15. This is a very popular segment with canoeists and flows through an undeveloped corridor which the county is trying to preserve through very low density residential zoning.

Neuse River: A 5 mile segment through the City of Kinston from river mile 83 to river mile 88. Even though this segment is bordered on one side by Kinston, a city of 25,000 people, the city is essentially hidden by high river banks and a natural screen of river birch, cypress and sycamore trees. In addition, the city is spending much time and effort in developing a river park and trail that makes the river more accessible to its residents and ties together several existing historic sites and recreational facilities. Efforts are also being made to clean up litter and dress up a rip rapped segment of the shoreline.

In closing, the Division hopes that this work has met NPS expectations and welcomes any comments that would improve the updating effort on the remaining North Carolina NRI rivers.

STREAMS SEGMENTS BEING CONSIDERED FOR THE
NORTH CAROLINA NATURAL AND SCENIC RIVERS SYSTEM

1. Alligator River/Northwest and Southwest Forks/Swan Lake Creek:
Alligator River - A 26 mile segment from the mouth of Swan Lake Creek upstream to New Lake Fork near NC 94 (Tyrell and Hyde Counties).
Northwest and Southwest Forks - A 10 mile segment including 6 miles of the Northwest Fork of the Alligator River up to an including 4 miles of the Southwest Fork in Gum Neck east of NC 94 (Tyrell County).
Swan Lake Creek - A 6.5 mile segment from its confluence with Alligator River to its headwaters. (Tyrell and Hyde Counties).
2. Cape Fear River - A 37.5 mile segment from the NC 217 bridge in Harnett County to the confluence of the Deep and Haw Rivers (Harnett and Chatham Counties).
3. Cashie River - A 38 mile segment from its confluence with the Middle River to the mouth of Connarritsa Creek (Bertie County).
4. Dan River - A 45 mile segment from the Virginia/North Carolina line (Rockingham County) upstream to the mouth of Town Fork Creek west of the Town of Walnut Cove (Rockingham and Stokes Counties).
5. Fishing Creek - A 42 mile segment from its confluence with the Tar River to the Nash/Franklin County line (Edgecombe/Halifax/Nash and Warren Counties).
6. Green River - A 16 mile segment from the backwaters of Lake Adger to the Lake Summit Dam (Henderson and Polk Counties).
7. Haw River - A 28 mile segment from the US 64 bridge to the dam at Sweptsonville (Chatham, Alamance and Orange Counties).
8. Little River (Lower) - A 46 mile segment from its confluence with the Cape Fear to the mouth of James Creek (Cumberland/Harnett and Hoke/Moore Counties).
9. Lumber River/Drowning Creek - A 125 mile segment from the US 74/NC 130 bridge across the lower Lumber River to a small dam near the headwaters of Drowning Creek on the Moore/Montgomery County line (Robeson/Columbus, Hoke/Scotland, Richmond/Moore and Montgomery Counties).
10. Mayo River - A 14 mile segment from just upstream of Mayodan to the Virginia/North Carolina line (Rockingham County).

11. Mill Creek - A 27 mile segment from its confluence with the Neuse River upstream to the confluence of Mill Swamp Branch and Jumping Run (Wayne and Johnston Counties).
12. Mitchell River - A 15 mile segment from the mouth of South Fork, river mile 7, to river mile 22 about 1 mile west of Devotion (Surrey County).
13. Nanatahala River - An 18 mile segment from the backwaters of Lake Fontana, near Wesser, to the Lake Aquone Dam (Macon and Swain Counties).
14. Nolichucky/Cane/North Toe/South Toe Rivers:
 - Nolichucky River - A 10 mile segment from the North Carolina/Tennessee State line to the confluence of the Cane and North Toe Rivers (Mitchell and Yancey Counties).
 - Cane River/Price Creek - A 21 mile segment from the Cane Rivers confluence with the Nolichucky and South Toe Rivers upstream to and including the lower 2 miles of Price Creek (Yancey County).
 - North Toe River/Big Crabtree Creek - A 27 mile segment from the North Toes confluence with the Cane and Nolichucky Rivers upstream to and including 2 miles of Big Crabtree Creek (Mitchell and Yancey Counties).
 - South Toe River - A 15 mile segment from its confluence with the North Toe River to the SR 1152 bridge (Yancey County).
15. North Fork French Broad River - A 13 mile segment running from the confluence with the French Broad River near Rosman to its headwaters south of the Jackson/Transylvania County Line (Transylvania County).
16. North River/Indiantown Creek - A 14 mile segment from the inter-coastal waterway in North River at Taylor Bay to the US 158 bridge on Indiantown Creek (Currituck and Camden Counties).
17. Rocky River - A 31 mile segment from its confluence with the Deep River to a dam located north of Siler City (Chatham County).
18. Sarem and Bennetts Creek:
 - Sarem Creek - A 5 mile segment from its confluence with the Chowan River to Gum Branch (Gates County).
 - Bennetts Creek - An 18 mile segment from its confluence with the Chowan River to Merchants Mill Pond (Gates County).
19. Second Creek - A 4.8 mile segment from its confluence with Alligator River to its headwaters in Big Savanna south of US 64 (Tyrell County).

20. South and Black Rivers:

South River - A 59 mile segment from its confluence with Black River to the SR 1414 bridge at Autryville (Pender, Bladen and Sampson Counties).

Black River - A 68 mile segment from its confluence with the Cape Fear River to the SR 1134 bridge near the mouth of Six Runs Creek south of Ingold (Pender, Bladen and Sampson Counties).

21. Toxaway River - A 7 mile segment from the North Carolina/South Carolina state line to the Lake Toxaway Dam (Transylvania County).
22. Trent River - A 56 mile segment from the mouth of Hayward Creek upstream from New Bern to the mouth of Tuckahoe Swamp Creek (Craven and Jones Counties).
23. Uwharrie River - A 35 mile segment from its confluence with the Cape Fear River to the SR 1193 bridge (Montgomery and Randolph Counties).
24. Waccamaw River - A 45 mile segment from the North Carolina/South Carolina state line to Lake Waccamaw (Brunswick and Columbus Counties).
25. Warrior Fork - A 6.5 mile segment from its confluence with the Catawba River near Morganton to the SR 1439 bridge (Burke County).
26. Watauga River - A 26 mile segment from the North Carolina/Tennessee state line to the Watauga/Avery County border (Watauga and Avery Counties).
27. White Oak River - A 39 mile segment from the NC 24 bridge at Swansboro upstream to and including one mile segments of both the North and South Prongs (Onslow, Carteret and Jones Counties).
28. Yadkin River - A 41 mile segment from the Davie/Rowan county line (and mouth of the South Yadkin River) to the Davie/Yadkin county line (Davie, Davidson and Forsyth Counties).

APPENDIX C

A BILL TO BE ENTITLED

AN ACT TO INCREASE APPLICATION FEES FOR POLLUTION CONTROL PERMITS,
AND TO AUTHORIZE AN ADDITIONAL FEE FOR GRANTING POLLUTION CONTROL
PERMITS.

The General Assembly of North Carolina enacts:

Section 1. G.S. 143-215.3(a) is amended by deleting
subdivision (1) and substituting the following subdivisions to
read:

- "(1) To make rules implementing Articles 21, 21A, and 21B of
this Chapter.
- (1a) To charge fees for the following:
 - a. processing applications for permits issued under
Articles 21, 21A, or 21B of this Chapter;
 - b. administering permits issued under Articles 21,
21A, or 21B of this Chapter and monitoring
compliance with the terms of those permits; and
 - c. reviewing, processing, and publicizing applications
for construction grant awards under the Federal
Water Pollution Control Act. No fee may be charged
under this provision, however, to a farmer who
submits an application that pertains to his
farming operations.

The fee for processing an application for a permit issued under
Articles 21, 21A, or 21B of this Chapter may not exceed four
hundred dollars (\$400.00). The fee for administering and

monitoring compliance with permits issued under Articles 21, 21A, or 21B may not exceed ten thousand dollars (\$10,000)."

Sec. 2. This act shall become effective July 1, 1987, and shall apply to applications made on or after that date and to permits granted on or after that date pursuant to an application made on or after that date.

Explanation of Legislation

This bill changes the current fee scale for pollution control permits to allow a maximum application fee of \$400 and to allow an additional charge upon the issuance of those permits to cover administrative costs and the cost of conducting compliance inspections. Under current law only a permit application fee can be charged and that fee cannot exceed \$100.00. The permits affected by the change are those issued to control water pollution, air pollution, oil pollution, and hazardous substances.

A BILL TO BE ENTITLED

AN ACT TO REQUIRE A BOND OR OTHER COLLATERAL AS A CONDITION TO
ISSUE A PERMIT FOR THE OPERATION OF TREATMENT WORKS.

The General Assembly of North Carolina enacts:

Section 1. G.S. 143-215.1 is amended by inserting a new subsection to read:

"(d2) Bond or other Collateral Required. This subsection applies only to applicants, other than a unit of State or local government, who apply for a permit or renewal of a permit under subsection (c) or (d) to operate treatment works serving three or more units used for residential purposes; two or more units used as offices or for business, industrial, or commercial purposes; or two or more units used for a combination of the above purposes.

The Commission may not issue or renew a permit under subsection (c) or (d) unless the applicant has filed a bond, other collateral, or a written agreement approved by the Commission, as required below. An applicant shall furnish a bond in an amount of not less than ten thousand dollars (\$10,000) nor more than two hundred thousand dollars (\$200,000).

The Commission shall determine the amount of the bond in each case in accordance with rules promulgated by the Commission. The bond shall be conditioned on compliance with this Article and the terms of the permit, shall be payable to the State, shall be in a form acceptable to the Commission, and shall be secured by:

a corporate surety; a pledge of obligations of the federal government, the State, or a political subdivision of the State; a cash deposit; or any other negotiable security acceptable to the Commission. The applicant may file a separate bond for each permit or a blanket bond for all permits to which this subsection applies.

The applicant shall maintain the bond at the amount determined by the Commission. A blanket bond shall be maintained at the amount determined by the Commission until the expiration of all permits covered. If an applicant violates the term of a permit to which this subsection applies, the Commission may reexamine the bond amount to determine whether it should be increased. If, upon violation of a permit term by an applicant the Commission takes any of the actions listed below, the applicant shall immediately furnish the additional collateral needed to satisfy the bond requirement as determined by the Commission:

- (1) reexamines the bond and determines that the original amount of the bond should be increased; or
- (2) uses either a portion of the bond or the full amount of the bond to take corrective action to remedy the violation; or
- (3) increases the amount of the bond and uses all or part of the bond to take corrective action as provided above,

In lieu of a bond as provided above, an applicant may enter into a written operational agreement with the city or county in which the treatment works are located. The agreement shall state

that the applicant will not file a bond with the Commission to secure the treatment works' compliance with this Article and the terms of the permit. The agreement shall provide that if the Commission finds that the applicant has violated the terms of the permit or the provisions of this Article and notifies the city or county in writing to assume responsibility for the treatment works, the city or county, as appropriate, shall assume maintenance, operational, and financial responsibility for the treatment works. No permit may be issued until the agreement is approved by the Commission.

Failure by an applicant to satisfy the terms of the permit or provisions of this Article shall result in action on the bond or agreement by the Commission. The proceeds from any action taken on a bond by the Commission shall be used to bring treatment works back into compliance with the terms of the permit and the provisions of this Article.

An applicant is liable for expenses incurred by the Commission or by a city or county which exceed the amount of the bond furnished by the applicant and which are the result of an applicant's failure to comply with the permit terms or the provisions of this Article."

Sec. 2. This act shall become effective October 1, 1987.

Explanation of Legislation

This bill requires that a bond be posted by an individual applying for a wastewater discharge permit to install and operate certain types of treatment works. Units of State or local governments applying for wastewater discharge permits are excluded from the bond requirement. "Treatment works" are currently defined in the statutes as "any plant, septic tank, disposal field, lagoon, pumping station, constructed drainage ditch or surface water intercepting ditch, incinerator, area devoted to sanitary landfill, or other works not specifically mentioned...installed for the purpose of treating, equalizing, neutralizing, stabilizing, or disposing of waste." "Treatment works" addressed by this proposed amendment are those that function as "shared" waste systems. Specifically, treatment works that dispose of waste generated by any of the following are covered:

- (1) three or more residential units;
- (2) two or more units used as offices for business, commercial, or industrial purposes; or
- (3) two or more units used for a combination of the above.
(For example, one residential unit and one business office.)

The Environmental Management Commission or its designee (G.S. 143-215.3(4)) sets the bond amount in accordance with rules established by the Commission. The bond cannot be less than \$10,000 nor more than \$200,000. The types of collateral that may be used to secure the bond are listed in the bill.

The bill gives the Environmental Management Commission the authority to increase the bond amount upon a permit violation if necessary and requires that the applicant keep the bond amount designated by the Commission current for the life of the permit.

If the applicant does not want to file a bond, he may substitute a written agreement that he has with the city or county in which the treatment works are located stating that the applicant will not furnish a bond but that the local government agrees to assume maintenance, operational, and financial responsibility for the treatment works if there is a permit violation and the local government is directed by Environmental Management Commission to assume responsibility for the treatment works. The agreement must be approved by the Commission.

The Commission may take action on the bond if there is a permit violation and the applicant will still be liable for expenses incurred above the bond amount as a result of the violation.

The bond requirement becomes effective October 1, 1986.

A BILL TO BE ENTITLED

AN ACT TO PROVIDE THAT A SANITARY LANDFILL MAY NOT BE LOCATED
WITHIN 2500 FEET OF A MAJOR RIVER OR A MAJOR TRIBUTARY.

The General Assembly of North Carolina enacts:

Section 1. G.S. 130A-295.1 is amended by adding a new subsection to read:

"(c) The Department of Human Resources may not issue a permit for a sanitary landfill, as defined in G.S. 130A-290(16), to be located within 2500 feet of a major river or major tributary."

Sec. 2. This act is effective upon ratification and shall apply to all permit applications filed on or after that date and shall also apply to all permit applications filed prior to that date for which the permit has not been issued as of that date.

Explanation of Legislation

The bill provides that a landfill may not be located within 2500 feet of a major river or major tributary. Currently no statute addresses this issue. Rules promulgated by the Department of Human Resources currently require a 50 foot buffer between streams and rivers and disposal areas.

The effective date provides that the new 2500 foot buffer zone established by this act will be applicable to permits applied for on and after the date of ratification and to permits which were applied for prior to the ratification date but which had not yet been issued at the time of the ratification date.

